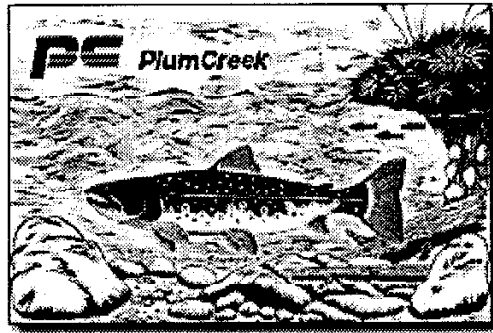


## LIVESTOCK GRAZING ON PLUM CREEK TIMBER COMPANY LAND IN THE NATIVE FISH HABITAT CONSERVATION PLANNING AREA

November 4, 1998



### Introduction

Numerous studies have demonstrated that improper livestock grazing can damage streams and degrade fish habitat (See review by Platts [1991]). Streambank trampling by livestock (by itself, or in concert with a reduction in riparian vegetation) can lead to channel widening, channel downcutting (or aggregation), and decreased streambank stability. When streams downcut and the local water table is lowered, riparian vegetation can be further reduced or eliminated. Channel widening can cause increased levels of fine sediment on the stream bottom, and increased stream temperatures (Meelhan and Platts 1978).

Livestock grazing has been a traditional use on much of the Plum Creek land in the Native Fish Habitat Conservation Planning area since the late 1800's. Because improper grazing can impact fish habitat and water quality, it is appropriate that the Conservation Plan (NFHCP) address grazing on Company lands.

The purpose of this white paper is to discuss a number of issues related to grazing in the planning area. These issues include the following:

- History of grazing on Plum Creek lands in the planning area
- Current status of grazing on Plum Creek lands in the planning area.
- Present condition of riparian areas and streams in grazing allotments on Plum Creek lands in the planning area.
- Plum Creek's Grazing Best Management Practices.

### **Background**

The earliest livestock grazing on Plum Creek lands probably occurred in the 1870's when cattle ranches were developed in the Blackfoot and Lower Clark Fork Valleys (Horstman and Whisennand 1997). However, the first known livestock grazing on what are now Plum Creek's lands occurred in the early 1880's. During this time ranchers expanded their cattle and horse operations from the Flathead Valley into Pleasant Valley, Smith Valley, and Lost Prairie west of Kalispell (McKay 1994). Also during the 1880's, sheep grazing was rapidly expanding in the Bitterroot and Middle Clark Fork River Valleys. This included a herd of 1000 sheep in the Miller Creek area southeast of Missoula (Horstman and Whisennand 1997). By 1890, sheep began to outnumber cattle in western Montana (Horstman and Whisennand 1997; McKay 1994). A renewed expansion of sheep grazing in western Montana began in the 1910's as a result of forage made available following the 1910 wildfires and good market conditions. This continued through World War II.

Although the exact areal extent and magnitude of livestock grazing on Plum Creek land during the late 1800's and early 1900's is unknown, it was likely confined to sparsely-forested areas and natural meadows, or followed forage made available after wildfire or timber harvest. As mentioned previously, wildfires burned vast acreages of forestland in the northern Rockies between 1910-1919 and included large amounts of Plum Creek land. Most timber harvest on Plum Creek's timberlands first occurred around 1900, when mills were built near Missoula, Kalispell and Libby. Though timber harvesting in the region slowed during the depression, it quickly increased following World War II (McKay 1994).

Timing of livestock grazing in the planning area has largely emphasized season-long grazing during the summer months. Leaseholders typically own a ranch in the area and keep their cattle on their land during the fall, winter, and spring. In late spring, they would herd, or truck, their animals to the summer range (Plum Creek's lease land). Turnout typically ranges from late May to mid-June. They would then hay their lands during the summer to stockpile feed for the winter. Animals were rounded-up (or wandered back to their home ranch) between late September and snowfall. During this summer grazing season, leaseholders would typically do little or no management of their herd, in terms of moving it around the allotment. As a result, animals would spend their time in the most desirable portions of the allotment. In most cases, these areas were riparian areas where lots of forage, shade, and water were available.

Because of the transitional nature of forage production in forested environments, cattle numbers increased following heavier timber harvesting in the 1950's through the 1970's. As these cut over lands regenerated with sapling-sized trees, cattle numbers have been reduced since the late 1980's.

Historic timber harvesting was also not sensitive to riparian zones. In many cases, timber in streamside areas was clearcut, and equipment operated immediately adjacent to streams. In many areas west of Kalispell, extensive logging took place in around World War II for milling of railroad ties. Often portable mills were set up adjacent (or over streams). Timber was skid down the hillsides to streams, then down (or along) the streams to the "mill-set." Remnants of these mill-sets are still visible today. In many cases, the logging and skidding adjacent to streams opened them up and made available forage for cattle. In many cases, the riparian areas adjacent to these streams have been

maintained in a grass condition and have not regenerated with trees due to heavy cattle use. Immediately adjacent to these riparian areas, large second growth-timber has grown. These areas have been referred to as "cattle highways" because of the concentrated use by cattle for grazing and movement.

Prior to 1989, Glacier Park Company (a subsidiary of Burlington Resources) solely and independently managed grazing on Plum Creek timberlands. Only when Plum Creek became a separate company in 1989 was full management control over livestock obtained. The amount of grazing lands owned by Plum Creek dramatically increased in 1993 with the purchase of Champion International's timberlands in Montana. These lands tended to be lower-elevation and flatter, thus more conducive to grazing.

Impacts to water quality and fish habitat due to grazing have only recently become a priority concern for Plum Creek. As discussed above, Plum Creek gained control over grazing of Company lands in 1989. This grazing land-base quadrupled with the purchase of Champion's timberland in 1993. Concern over grazing impacts also was enhanced in 1991, when Plum Creek adopted a set of Environmental Principles to govern resource management activities. One of these Principles states: *"Meet or exceed state and federal standards by employing Best Management Practices for the protection of water quality and aquatic resources..."* This Environmental Principle heightened awareness and increased implementation of Forestry Best Management Practices, but was not limited in scope to just forestry activities. Also in the early 1990's, the Montana Streamside Management Zone Act and Regulations were implemented. These rules mandated buffers along streams for forest activities; however, cattle grazing was not affected. This apparent double standard made little sense because along many streams it was obvious that grazing was a primary water quality impact. All of these factors culminated to create a desire by Plum Creek to improve grazing management on Company lands. In 1995, Plum Creek adopted a set of Grazing Best Management Practices (BMP's) to address these concerns. These BMP's are discussed later in the paper.

Managing grazing in forested lands presents numerous challenges when compared to grazing non-forested (range) lands. Forested areas are notoriously difficult to fence because of the typically steeper topography and timbered slopes. When fences are constructed, they require constant maintenance due to damage caused by blown-down timber, deep snow, and big game such as moose and elk. Fences also interfere with timber harvest activities. As a result of all these limitations, fencing has traditionally been viewed with skepticism. Additionally, due to the typically steeper topography in forested lands, cattle tend to congregate along stream bottoms when the area accessible and forage is available.

In terms of environmental management and protection, grazing presents unique challenges in comparison to timber harvesting. Grazing is an annual occurrence (at least historically), whereas timber harvesting is periodic. Cattle typically graze right up to the stream edge unless the area is fenced or access is precluded due to physical barriers (trees, topography, etc.). Forestry activities can employ stream buffers, where logging activities are halted, or modified. In other words, loggers can be directly controlled by marking of a streamside buffers, and enforced through contract requirements, performance bonds, etc. Cows ignore these markings and will not sign contracts.

### **Current Status of Grazing on Plum Creek Lands in the Planning Area**

At present, Plum Creek has 764,560 acres classified as available for livestock grazing (98% of which is in Montana). Of the available grazing area, 588,779 acres are currently leased to 106 leaseholders.

The other 175,781 acres of available grazing lands are currently vacant. These acres, distributed by Tier I and Tier II watersheds, are summarized in Table 1.

Table 1. Acres available for livestock grazing by Tier I and Tier II watersheds

Lease Status	Tier I Watershed Area Leased (ac)	Tier II Watershed Area Leased (ac)	Total Area Leased (ac)
Active	56319	532460	588779
Vacant	31279	144502	175781
Total	87598	676962	764560

Twenty-eight out of 82 Tier I watersheds in the planning area (34%) contain some amount land classified by Plum Creek as suitable for grazing. Grazing land acreage within these 28 watersheds is shown in Appendix A. Tier I watersheds with significant active leases include Belmont Creek, Cottonwood Creek, Upper Lolo Creek, and the North Fork of the Blackfoot River. Tier I watersheds with large vacant leases include Big Rock Creek and Fishtrap Creek in the Thompson River Basin in Montana and Ahtanum Creek in Central Washington.

Tier II basins with large amounts of land presently leased for grazing include the Blackfoot River (113,000 acres), Middle Clark Fork (210,000 acres), Middle Kootenai (96,000 acres), and the Upper Clark Fork River (65,000 acres). These five basins contain 91% of the currently leased grazing lands. Appendix A lists the acres of grazing lands for Tier II lands in each river basin.

In 1998, a total of 21,500 Animal Unit Months (AUMs) were contained in the 106 leases. An AUM is the amount of food or forage required by a "cow-calf" pair for one month. Assuming the grazing season lasts for approximately four months, 21,500 AUMs would mean that about 5,375 cow-calf pairs grazed Plum Creek lands for the summer of 1998. Distribution of AUMs in the planning area is reasonably approximated by the area (acres) leased.

The length of stream containing bull trout, by life history stage, within grazing lands is summarized in Table 2. Active grazing leases presently include 21.3 miles of bull trout spawning/rearing streams, 12 miles of migration/foraging streams, and 19.9 miles of key migratory rivers. Vacant leases encompass another 25.9 miles of spawning/rearing streams and 19.7 miles of key migratory rivers.

**Table 2. Miles of bull trout spawning, migration, and foraging streams on Plum Creek land in the planning area.**

Lease Status	Bull Trout Spawning/Rearing Streams (miles)	Bull Trout Migration, Foraging, Over-wintering (miles)	Key Bull Trout Migratory Rivers (miles)
Active	21.3	12	19.9
Vacant	25.9	2.5	19.7
Total	47.2	14.5	39.6

The total length of streams (by various gradient classes) affected by grazing leases (active and vacant) is shown in Table 3. This includes all streams, not just streams occupied by bull trout. The gradient ranges follow those outlined by Light et al. (1998). Of particular interest are lower-gradient streams, which tend to be more sensitive to grazing disturbance (Rosgen, 1996).

**Table 3. Miles of stream within classified grazing lands on Plum Creek ownership in the planning area by Tier I and Tier II designation, and by stream gradient class.**

Gradient Class	Tier I Streams		Tier II Streams		Total		
	Perennial	Interm.	Perennial	Interm.	Perennial	Interm.	Total
0%-1.5%	8.5	5.8	79	53.1	87.6	58.9	146.5
1.5-3%	17.5	13	90.2	98.9	107.7	111.9	219.6
3%-6%	24.8	18.8	116.5	150.9	141.3	169.7	311
>6%	45.1	131.3	223.3	849.5	268.4	982.3	1250.7
Total	95.9	168.9	509	1152.4	605	1322.8	1927.8

#### **Current Conditions of Grazed Streams on Plum Creek land in the Planning Area**

Plum Creek has some limited information that provides insight as to the current impact of livestock grazing on streams in the planning area. This information was obtained during watershed analyses, stream monitoring, and fish surveys conducted since 1993. Each of these studies is summarized below, and is intended to give a general picture of current grazing impacts at various locations across the NFHCP area.

#### **Thompson River Basin Fish Habitat and Riparian Surveys**

In addition to the watershed analyses, fish and fish habitat surveys were conducted throughout the Thompson River Basin in 1997 (Plum Creek Timber Company, 1997). Sixty three of these stream

reaches were within grazing lands on Plum Creek property. In each stream reach, data were collected along four riparian transects running perpendicular to the stream reach. As part of the riparian inventory, surveyors described visible disturbances and assigned a probable cause. The intent was to generally describe visible disturbance. As this was not a major aspect of the inventory, it was subjective. A "light grazing/browsing" call was made if the riparian area had cattle grazing in the previous year as evidenced by fresh cowpies, hedged brush, and some grass utilization. A "severe grazing/browsing" call was made where the stream reach exhibited more severe impacts, such as stream banks laid back due to livestock trampling with bare mineral soil exposed. This was typically accompanied by heavy utilization of riparian grasses and shrubs.

Of the 252 total riparian transects taken in the 63 stream reaches, 24% were described as having "Light Grazing/Browsing" impacts from cattle, and 1% had "Severe Grazing/Browsing" impacts. Within Tier 1 and Tier 2 watersheds, impacts were as follows: In Tier 1 watersheds, 3% of stream reaches were identified as having light impacts and 3% were identified as having severe impacts. All of these impacts were identified along Fishtrap Creek. In Tier 2 watersheds, 31% of transects had light grazing impacts and 0.5% had severe impacts. All impact areas had stream gradients less than 8%.

#### Belmont Creek

Belmont Creek drains an 18,630-acre Tier I watershed tributary to the Blackfoot River east of Missoula, Montana. Cattle grazing since the early 1900's have influenced this watershed. At present, 13,667 acres in the Belmont Creek are leased for cattle grazing. Sugden (1994) examined grazing impacts along Belmont Creek as part of a pilot watershed analysis. This study found that 7% of streams occupied by bull trout had trampled banks, widened channels, and loss of riparian vegetation. In addition, another 22% of the bull trout spawning and rearing streams had a reduction in riparian vegetation attributed to cattle grazing. In general, impact areas were concentrated in lower-gradient portions of the channel network.

#### Mount Creek

Mount Creek drains a 34,500 acre Tier II watershed west of Kalispell. As with Belmont, the Mount Creek watershed has had cattle grazing since the turn of the century. A 1993 analysis (Sugden 1993) found that approximately half of the fish-bearing stream length on Plum Creek land had trampled banks, channel widening and downcutting, and loss of riparian vegetation due to cattle grazing.

#### Thompson River Basin Watershed Analyses

Two grazed watersheds in the Thompson River Basin (Beatrice Creek and Boiling Springs Creek) were studied by Sugden et al. (1998). For the Beatrice Creek watershed (Tier I), little or no present-day grazing impacts to water quality were observed. This could be explained by the dense riparian forest adjacent to most of Beatrice Creek, which would preclude cattle access to the stream. In the Boiling Springs watershed (Tier II), present-day grazing impacts were observed in a few locations, but were minor in their magnitude and extent.

### **Livestock Grazing as an Identified Threat to Bull Trout in the Planning Area**

The Montana Bull Trout Restoration Team prepared a series of reports which describing the status of bull trout for eleven basins (metapopulations) in Western Montana. Through a Delphi process, they identified high risks to these bull trout populations, both historically and for recovery. Through this process, grazing was identified as a high risk to the bull trout populations in the Upper Clark Fork, Bitterroot, and Blackfoot River drainages. Grazing was identified as being a locally significant threat in the Thompson, Stillwater, and Fisher River watersheds.

In Idaho, bull trout problem assessments have not identified grazing as a significant threat to bull trout on Plum Creek lands (Clearwater Basin Bull Trout Technical Advisory Team 1998a 1998b; Panhandle Basin Bull Trout Technical Advisory Team 1998). This is not unexpected since grazing was never an historic land use in these areas.

In Washington, livestock grazing was identified as a significant threat to bull trout in Ahtanum Creek, a Tier 1 watershed in the planning area (Washington Department of Fish and Wildlife 1997).

### **Plum Creek Grazing Best Management Practices**

In 1995, Plum Creek implemented a set of Grazing Best Management Practices (BMPs) in the Rocky Mountain Region (Plum Creek Timber Company, 1995). These grazing BMPs are an implementation strategy consistent with the Prescribed Grazing BMP system developed by the Montana Grazing Practices Work Group (NRCS 1996). Plum Creek's Grazing BMPs have three primary components:

Component 1 is a set of minimum environmental performance standards that are to be achieved on Plum Creek property. These standards are generally based on SCS guidelines and similar standards developed by the Thompson River Grazing Cooperative, but are also based on Plum Creek's corporate expectation. These performance standards specify maximum levels of streambank instability, riparian compaction, grass/shrub utilization, and tree/shrub regeneration. The local lease administrator can adjust these standards as needed to fit site potential. These performance standards are not treated as "thresholds" which after they are exceeded all grazing ceases. Success of the program is measured by a consistent trend toward the standards.

The second component is a requirement for each leaseholder to prepare an annual range management plan (RMP) that describes the management system that will be implemented during that grazing season. This system must be designed to achieve the performance standards in Component 1. The Grazing BMP document provides a toolbox of individual BMPs that the leaseholder can include in the RMP. Some of these BMPs are mandatory (e.g., salting away from streams, maintaining existing fencing, etc.) and some are optional (e.g., fencing riparian areas). Because of the site-specific nature of environmental conditions and sensitivities on each grazing lease, a simplistic set of mandatory BMPs is not workable. This system has built-in flexibility that gives the leaseholder latitude to implement a system they believe will meet our expectations.

Although fencing is optional, there are times that Plum Creek has made it mandatory to achieve our resource management objectives. In most cases, environmental damage was acute and more rapid recovery (than the BMPs would provide) was desired. In most cases, Plum Creek has purchased the

fencing supplies and the leaseholder provided the labor to install it. This has been done adjacent to Kesler Creek (tributary to Mount Creek), Belmont Creek, Freeland Creek (tributary to Lake Mary Ronan), and the Upper Thompson River.

The third component involves monitoring and operational adaptive management. Twice each season, the leaseholder monitors stream and riparian conditions at several sensitive locations on the allotment. Monitoring involves a simple form and photo-points that are submitted to Plum Creek. With regard to adaptive management, the leaseholder is required to submit an "end of year report" that describes what worked well during the grazing season and what did not with regard to environmental compliance, and includes a list of things that need to be modified the next years RMP. If adequate progress is not made in attaining the performance standards, or improving conditions over time, Plum Creek lease administrators can require specific practices be implemented, or terminate the lease.

#### **Is Plum Creek's Grazing BMP Strategy Resulting in Improved Conditions?**

Based on the observations of the authors, discussions with individual lease administrators, and leaseholder monitoring, riparian conditions have been put on a positive trajectory since the BMP program was initiated. However, we have scant scientific data to support these observations and opinions. One place where we do have hard data is in Kesler Creek (a tributary to Mount Creek). Since the summer of 1993, a portion of Kesler Creek has been excluded from cattle grazing (through fencing) as part of the local Range Management Plan. Cross sections and photo points taken by Plum Creek at several locations along this stream reach since 1993 demonstrate the dramatic recovery of streams in response to cattle enclosure (See Appendix B). As indicated by the photos and cross sections, these changes include channel narrowing, increased pool formation, improved bank stability, and increased grass/forb/shrub recovery.

To obtain hard data on the effectiveness of Plum Creek's grazing BMPs, the NFHCP could include a commitment to establish a network of long-term riparian monitoring plots where conditions could be periodically inventoried.

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**Appendix A. Status of grazing lands in Tier 1 watersheds in the NFHCP area.**

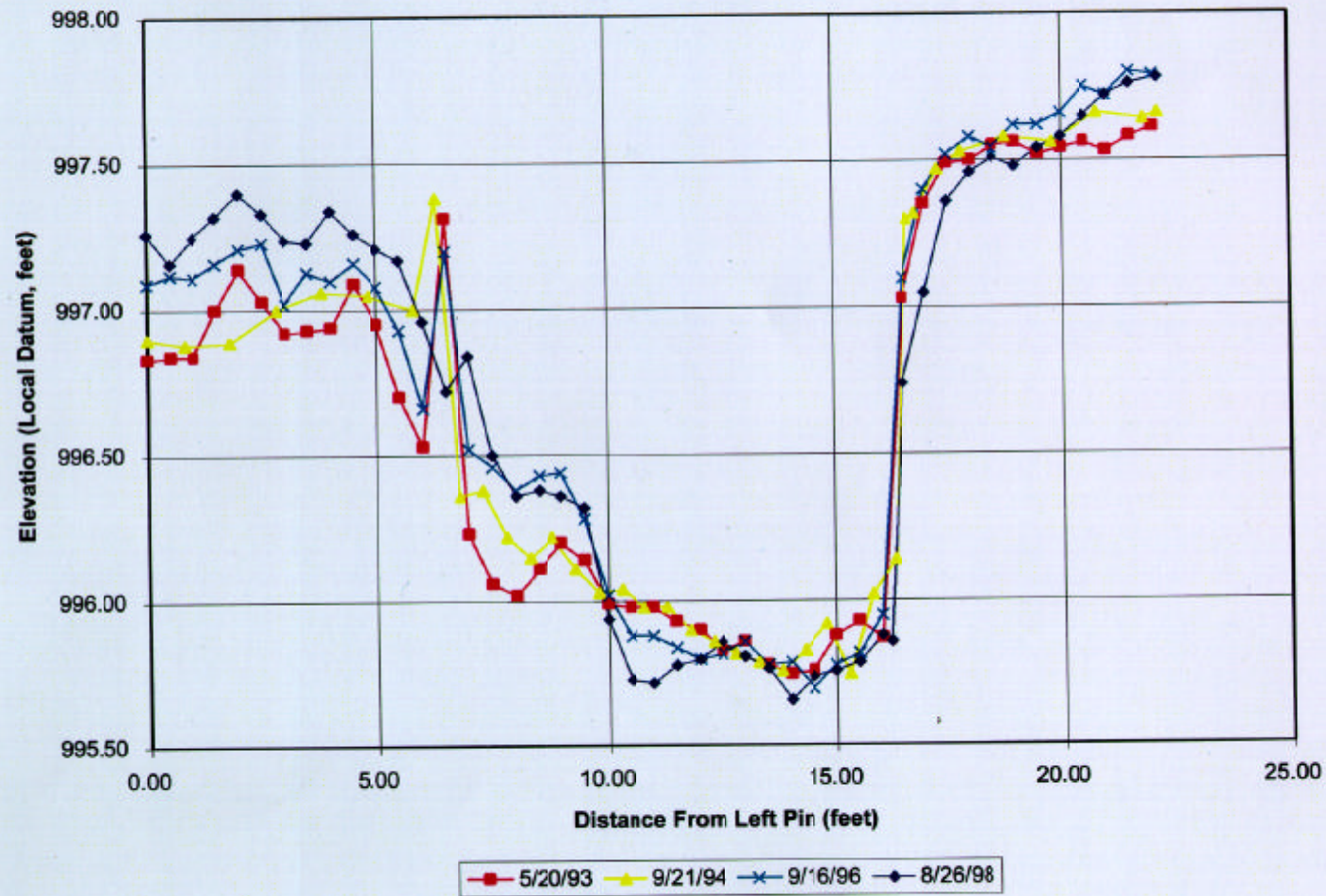
basinname	active	vacant	Grand Total
Ahtanum Creek	0	7442	7442
Arrastra Creek	2007	0	2007
Belmont Creek	13667	0	13667
Big Rock Creek	0	6471	6471
Boles Creek	37	0	37
Chippy Creek	1454	474	1928
Cold Creek	0	339	339
Cottonwood Creek	9760	159	9919
Dog Creek	962	0	962
Dunham/Monture Creek	18	0	18
Fishtrap Creek	3	11422	11425
Gold Creek	1521	0	1521
Granite Creek	0	15	15
Harvey Creek	2625	0	2625
Jim Creek	0	0	0
Johnson Creek	0	2	2
Keep Cool Creek	1920	0	1920
Logan Creek	91	3172	3263
North Fork Blackfoot River	6075	1146	7221
Petty Creek	0	196	196
Placid Creek	864	238	1102
Poorman Creek	1894	0	1894
Shroder Creek	0	118	118
South Lolo Creek	1716	0	1716
Twin Creek	1470	0	1470
Upper Blackfoot	1923	0	1923
Upper Fish Creek	0	85	85
Upper Lolo Creek	8312	0	8312
Grand Total	56319	31279	87598

**Appendix A (Continued). Summary of grazing lands in Tier 2 watersheds (by basin).**

basinname	active	vacant	Grand Total
Ahtanum Basin	0	2688	2688
Bitterroot River	14894	17113	32007
Blackfoot River	113101	6740	119841
Flathead River	25524	17970	43494
Lochsa River	32	0	32
Lower Tieton River Basin	2642	0	2642
Middle Clark Fork River	209813	76981	286794
Middle Kootenai River	95560	19090	114650
Swan River	5217	1098	6315
Undefined Tier 2-WA-YAK	361	345	706
Upper Clark Fork River	65000	2477	67486
Upper Kootenai River	307	0	307
Grand Total	532460	144502	676962

**Appendix B. Cross-section and photo monitoring data for Kesler Creek. Cows have been exclosed from this portion of Kesler Creek since 1993.**

**Kessler Creek  
Cross Section 1-1**



## Kesler Creek Cross Section 1-1



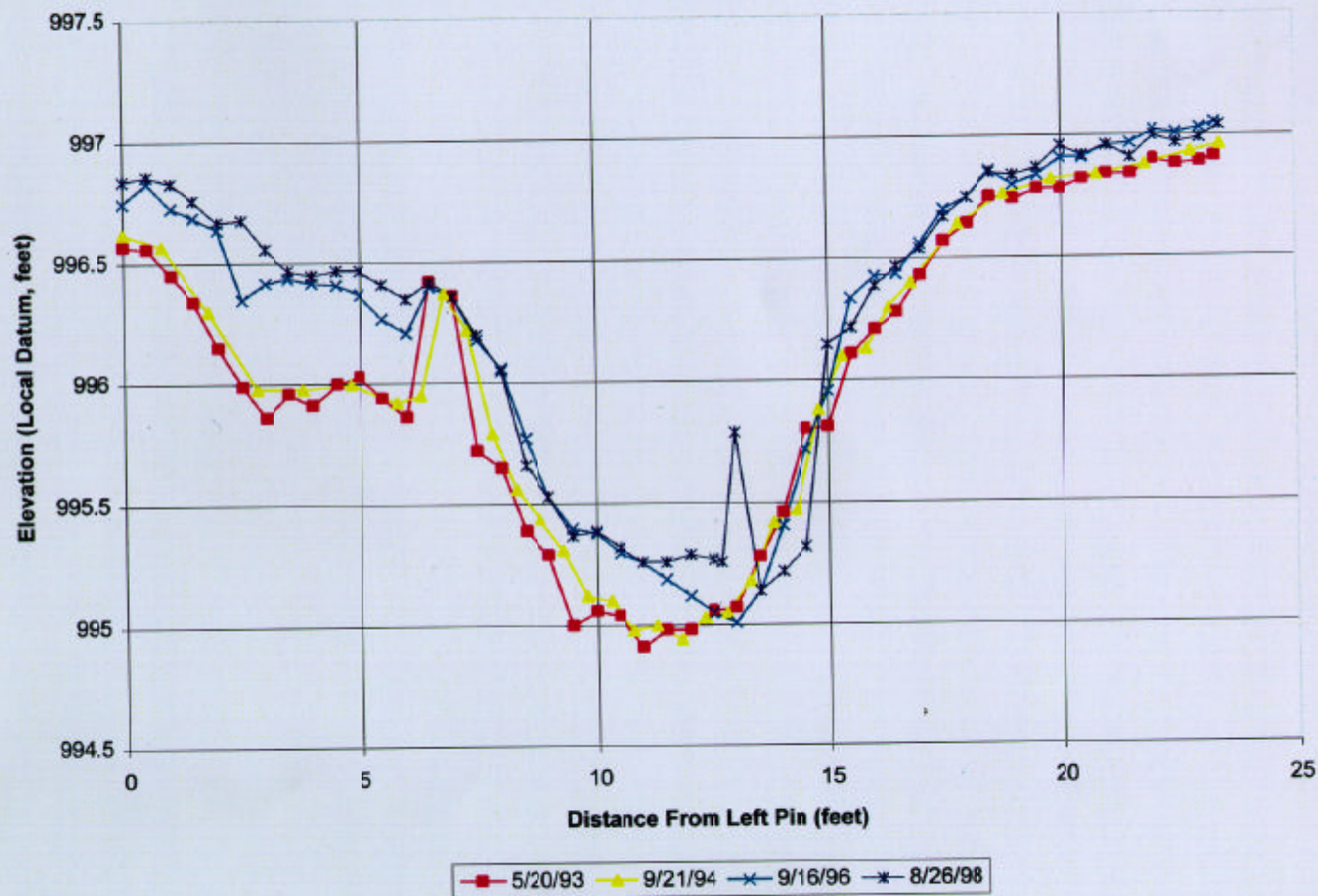
1993 – Looking down transect toward left bank.



1998

↑ Left Bank Pin

# Kessler Creek Cross Section 1-2



# Kesler Creek Cross Section 1-2



1993

↑ Right Bank Pin

Left Bank Pin ↑

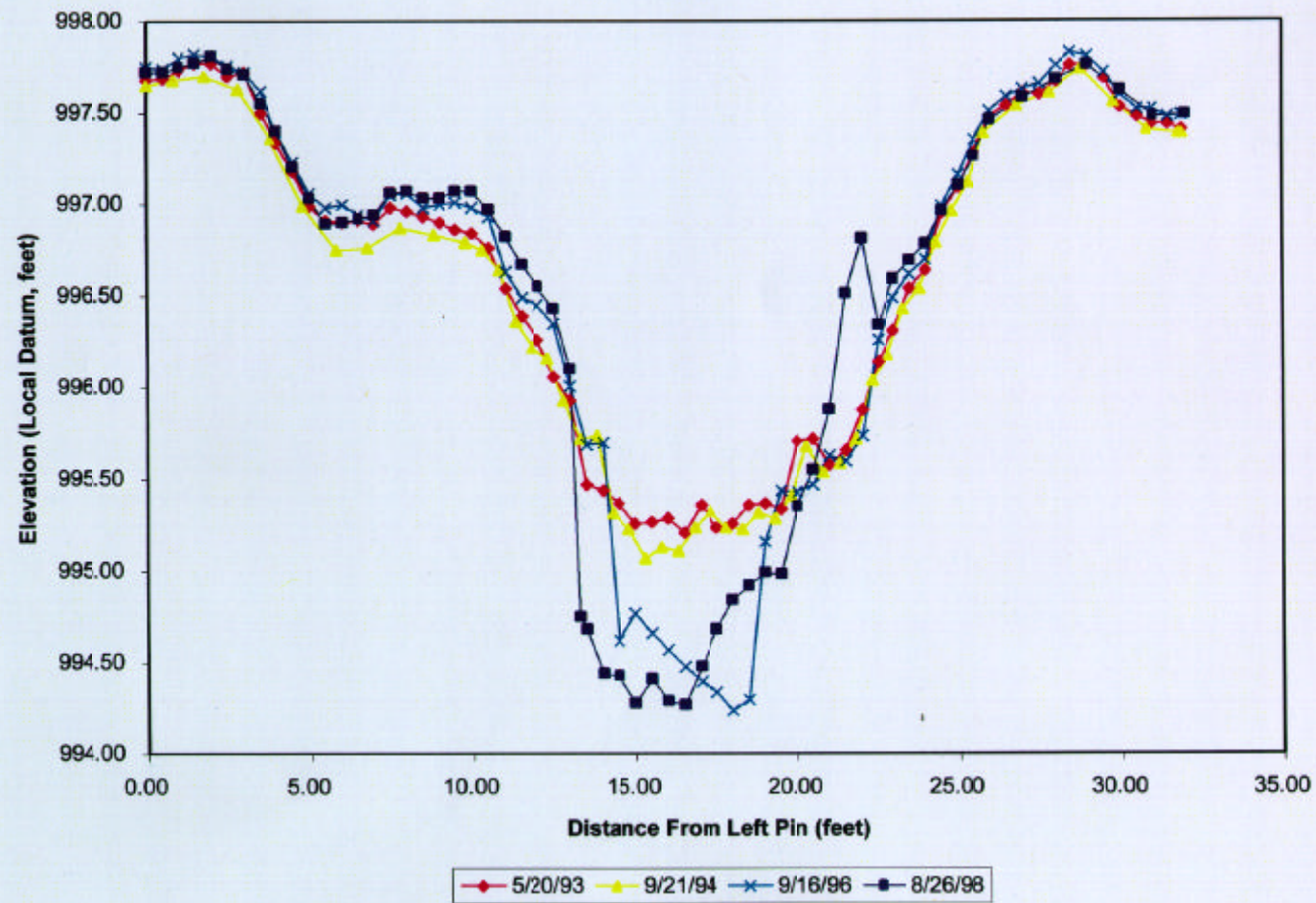


1998

↑ Right Bank Pin

↑ Left Bank Pin

**Kessler Creek  
Cross Section 1-3**



# Kesler Creek Cross Section 1-3



1993

↑ Right Bank Pin

Left Bank Pin ↑



1998

↑ Right Bank Pin

↑ Left Bank Pin